

5.8 PALEONTOLOGICAL RESOURCES

The Project includes the construction, operation, maintenance, and abandonment of up to 850 megawatts (MW) of capacity by a solar power generating facility and its ancillary systems in two phases (Phase I: 500MW [approximately 5,838 acres]/Phase II 350MW [approximately 2,392 acres]). The Project will consist of up to approximately 34,000 SunCatchers. Construction is anticipated to occur over an approximate four-year period beginning in 2010 and ending in 2014. It is estimated that approximately an average of 400 construction and 180 long-term labor jobs will be required.

The Project is located in an undeveloped area of San Bernardino County, California approximately 37 miles east of Barstow, California and north of Interstate 40 (I-40) between approximately 1,925 to 3,050 feet above mean sea level. The Project is located primarily on Bureau of Land Management (BLM) land within the Barstow Field Office. Approval of the Project Right-of-Way (ROW) Grant Application (Form 299, Applications CACA 49539 and 49537) will result in the issuance of a ROW Grant Permit for use of federal lands administered by the BLM. The Project would require a plan amendment to the 1980 California Desert Conservation Area (CDCA) Plan.

The area where the Project would be constructed is primarily open, undeveloped land within the Mojave Desert. The Cady Mountain Wilderness Study Area (WSA) is located north of the Solar One site. The Pisgah Crater, within the BLM-designated Pisgah Area of Critical Environmental Concern (ACEC), is located south and east of the Project (south of I-40 by several miles). Several underground and above ground utilities traverse the area as well.

An approved interconnection letter from California Independent Service Operator (CAISO) has been issued for the Project. The associated System Impact Study (SIS) is located in Appendix H. The SIS indicates that additional upgrades to the Southern California Edison (SCE) Lugo-Pisgah No. 2 Transmission Line and upgrades at the SCE Pisgah Substation will be required for the full build out of the 850MW Project. Supplemental studies performed by SCE and CAISO indicate that capacity is available on the existing transmission system to accommodate less than the 850MW Project.

An on-site substation (i.e., Solar One Substation [approximately 3 acres]) will be constructed to deliver the electrical power generated by the Project to the SCE Pisgah Substation. Approximately twelve to fifteen 220kV transmission line structures (90 to 110 feet tall) would be required to make the interconnection from the Solar One Substation to the SCE Pisgah Substation. All of these structures would be constructed within the Project Site.

The Project will include a centrally located Main Services Complex (14.4 acres) that includes three SunCatcher assembly buildings, administrative offices, operations control room, maintenance facilities, and a water treatment complex including a water treatment structure, raw water storage tank, demineralized water storage tank, basins, and potable water tank.

Adjacent to the Main Services Complex, a 14-acre temporary construction laydown area will be developed and an approximately 6-acre construction laydown area will be provided adjacent to the Satellite Services Complex south of the Burlington Northern Santa Fe (BNSF) railroad. Two additional construction laydown areas (26 acres each) one will be located at the south entrance off Hector Road and the other at the east entrance just north of the SCE Pisgah Substation.

Temporary construction site access would be provided off of I-40 beginning east of the SCE Pisgah Substation and would traverse approximately 3.5 miles across the Pisgah ACEC requiring an approximate 30-foot ROW. Long-term permanent access would be provided by a bridge over the BSNF railroad along Hector Road north of I-40. Equipment may be transported during construction via trucks and/or rail car (through the construction of a siding), that would be located on the north side of BNSF railroad and east of Hector Road or as authorized by BNSF.

Water would be provided via a groundwater well located on a portion of the BLM ROW grant north of the Main Services Complex and transported through an underground pipeline. The expected average well water consumption for the Project during construction is approximately 50 acre-feet per year during the construction period. Under normal operation (inclusive of mirror cleaning, dust control, and potable water usage), water required will be approximately 36.2 acre-feet per year. Emergency water may be trucked in from local municipalities.

The following sections discuss paleontological resources related to the construction, operation, maintenance, and abandonment of the Project. For the purposes of both California Environmental Quality Act (CEQA) and National Environmental Policy Act (NEPA), paleontological resources (fossils) are defined as the remains or other indications (trace fossils) of prehistoric organisms such as animals and plants. Fossils facilitate three areas of scientific investigation: (1) establishing the relative ages of geologic horizons that contain them, (2) reconstructing the ancient environments that these organisms inhabited, and (3) detecting the existence, distribution, and evolutionary trends of diverse types of organisms, many of which are now extinct. Investigation of the geologic events that deposited the fossils cannot adequately proceed without an understanding of the fossils.

The potential environmental impacts on paleontological resources that may result from construction of the Project are summarized in this report. Section 5.8.1 provides a description of the local environment that may be affected by construction and operation of the Project. Section 5.8.2 describes these environmental consequences. Section 5.8.3 discusses potential cumulative impacts on paleontological resources. Section 5.8.4 presents proposed mitigation measures to reduce potential adverse impacts on paleontological resources. Federal, state, and local laws, ordinances, regulations, and standards (LORS) are listed in Section 5.8.5 as well as the professional standards that protect paleontological resources. Section 5.8.6 presents the participating agencies and agency contacts. Section 5.8.7 discusses the permits that may be required. Section 5.8.8 contains a list of references cited.

This section is designed to satisfy the requirements of the California Energy Commission (CEC). It is consistent with the standard measures for mitigating adverse construction related environmental impacts on significant paleontological resources established by the Society of Vertebrate Paleontology (SVP 1995, 1996). The complete technical report, Paleontological Resources Assessment: Project, is included as Appendix S and has been submitted separately under rules of confidentiality.

5.8.1 Affected Environment

5.8.1.1 Geographic Location

The Project is in an unincorporated area of San Bernardino County, approximately 37 miles east of the divergence of I-40 and I-15 near the City of Barstow, California. The Project is spread across four townships. In T 9 N, R 5 E, it includes all of sections 32, 34, and 35, three quarters of sections 19, 30, and 31, and one-half of section 28. In Township 9 North, Range 6 East, less than one-fourth of sections 31, 32, and 33. In Township 8 North, Range 5 East, all of sections 2, 3, 4, 5, 9, 10, 11, and 12. NE one-fourth of section 6. One-third section of sections 13 and 14; one-half of section 8, and slivers of 15, 16, and 17. In Township 8 North, Range 6 East, all of sections 5, 6, and 7, most of sections 4, 8, and 18, and a minor fraction of section 9 and 17. The Project lies within the Troy Lake, Hector, and Sleeping Beauty USGS 7.5 minute quadrangles (Figure 5.8-1). The elevation of the property slopes from north to south and varies from approximately 2800 to 1800 feet. The Project Site lies within the Mojave Desert physiographic province.

5.8.1.2 Regional Geologic Setting

The geology of the San Bernardino 2 degree sheet was mapped by Bortugno and Spittler (1986) at a scale of 1:250,000. Dibblee and Bassett (1966) mapped the area at a scale of 1:62,500. Information provided by these geologic maps as well as both published and unpublished reports form the basis of the following discussion. Individual maps and publications are incorporated into this report and referenced where appropriate. The distribution, type, and age of sediments immediately underlying the Project Area and their probability of producing fossils during Project construction are the main geological concerns of this discussion. The site-specific geology in the vicinity of the Project Site is discussed separately below.

5.8.1.3 Resource Inventory Methods

Methods used to develop the paleontological resource inventory of the Project Site and surrounding area are described below. These procedures follow guidelines from the CEC (2007) and the Society of Vertebrate Paleontologists (SVP) (1995) and included both a literature search and field investigation.

Both published and unpublished literature concerning area paleontological and geological topics was consulted. It is possible to define the surface distribution of the formations involved to estimate their subsurface distribution and gain some estimate of the paleontological productivity of these units from the literature. Another important source for data concerning areal distribution of known paleontological localities and productivity of various rock units is the records of pertinent paleontological collections. An archival database search was executed by the San Bernardino County Museum (SBCM) to determine whether any of the stratigraphic units found within the Project vicinity had previously yielded significant paleontological resources and whether any known localities lie within or near the site.

A field survey for any visible fossil remains within the Project Site and a one-mile radius was conducted from September 23 to 26, 2008. (Figure 5.8-2). A search was performed for exposures of sediment appropriate for producing fossils. During the field survey, attempts were made to detect the presence and nature of subsurface native sediments. Tertiary volcanic rocks were not surveyed, nor were areas of younger alluvium [both have low sensitivity for paleontological resources according to SVP Guidelines (1995)].

5.8.1.4 Paleontological Resource Assessment Criteria

It is the position of the SVP (1995) that a vertebrate fossil is considered significant unless otherwise demonstrated. Environmental statutes regard them in a like manner. This position is because of the relative rarity of vertebrate fossils. Vertebrate fossils are so uncommon that, in many cases, each recovered specimen will provide additional important information about the morphological variation or the geographic distribution of its species. The SVP recommendations (1995) also mention that significant invertebrate or botanical fossils are considered significant paleontological resources.

A rock unit is considered "sensitive" to adverse impacts if there is a high probability that grading, excavation, or other earth-moving will jeopardize significant fossil remains. Using criteria published by the SVP (1995), the paleontological importance or sensitivity (high, low, or undetermined) of each rock unit exposed in a project site or surrounding area is the measure most amenable to assessing the significance of paleontological resources because the areal distribution of each rock unit can be delineated on a topographic or geologic map. The paleontological sensitivity of a stratigraphic unit reflects its potential paleontological productivity and sensitivity as well as the scientific significance of the fossils it has produced. This method of paleontological resource assessment is the most appropriate because discrete levels of paleontological importance can be delineated on a topographic or geologic map.

Reasons for considering an individual fossil specimen scientifically important include:

- if it is well preserved,
- if it can be identified,
- if it is more complete than most specimens for that species,
- if it preserves one or more elements not known in most specimens of that species,
- if it is indicative of a particular time period,
- if it has not been recorded from that sedimentary unit,
- if it provides information concerning the environment in which it lived,
- if it could be the basis for description of a new species or comes from a site that produced the type (definitive) specimen of its species, and
- if it belongs to a species rarely encountered.

The Applicant considered the following criteria in establishing the importance and paleontological sensitivity of each rock unit exposed in the Project site or within the one-mile buffer zone:

- Estimation of the potential paleontological productivity of each rock unit on the evidence of fossil localities in or near the Project on the basis of published and unpublished sources.
- Consideration of the scientific significance of fossils from each of the rock units exposed within the Project Area.

Categories of Sensitivity

The SVP (1995) established three categories of sensitivity for paleontological resources in its standard guidelines for assessment and mitigation of adverse impacts to paleontological resources. The three categories are low, high, and undetermined.

Low sensitivity paleontological resources are categorized as rock units that are not sedimentary in origin. Likewise, sedimentary rock units that have been well examined and have not produced paleontological resources are considered to have low sensitivity. Monitoring is not usually recommended or needed during excavation in a rock unit with low sensitivity.

High sensitivity paleontological resources are categorized as rock units older than recent for which vertebrate or significant invertebrate fossils or a significant suite of plant fossils have been recovered. In areas of high sensitivity, full-time monitoring is recommended during any project-related ground disturbance.

Paleontological resources with undetermined sensitivity are categorized as sedimentary rock units for which little information is available. It is often possible for an experienced paleontologist to determine whether such a rock unit should be assigned a high or low sensitivity after he or she has performed a pedestrian survey and has made detailed observations of both natural and artificial exposures of the rock unit.

5.8.1.5 Resource Inventory Results

Stratigraphic Inventory

The general geology of the Pisgah area was mapped by Bortugno and Spittler (1986) at a scale of 1:250,000 and by Dibblee and Basset (1966) at a scale of 1:62,500. The following rock types or units were identified within a one-mile radius of the Project Area:

Tertiary andesite, Tertiary andesite breccia, Tertiary basalt, and Tertiary basalt breccia. Bortugno and Spittler (1968) designated these as Miocene volcanics. They outcrop in sections 32 and 33 of Township 9 North, Range 6 East, and sections 4 and 6 of Township 8 North, Range 6 East.

Miocene sandstone and claystone. These are the sediments designated as unnamed Miocene continental deposits by Bortugno and Spittler (1968). They are exposed to the west of the Project.

Older fanglomerate and gravel. Bortugno and Spittler (1968) included these under the category of older alluvium (undifferentiated). Within the Project boundaries, Older fanglomerate and gravel occurs in Sections 10, 11, 12, 14, and 15 of Township 8 North, Range 5 East. Included within these sediments are paleosols with silicified roots. (Figures 5.8-3 and 5.8-4) These are not mapped as such, but were noted south of the Project boundary in section 14, Township 8 North, Range 5 East in sediments mapped as Older fanglomerates and gravel by Dibblee and Bassett (1966).

Older alluvium. Dibblee and Bassett (1966) indicate that an unconformity separates the Older fanglomerate and gravel from the underlying Older alluvium. Where available, erosional cuts revealed profiles with multiple caliche horizons (Figure 5.8-5).

Basalt of Pisgah flow. These basalts (Figure 5.8-6) are part of the Lavic Lake volcanic field. This flow seems to have spread around the Older fanglomerate and the Older alluvium south of the Project, implying that the flow postdates them. The basalt barely enters the southern margin of the Project, in Section 8, Township 8 North, Range 5 East, and in Section 18, Township 8 North, R 6 East.

Surficial alluvium, surficial alluvial fan gravel, and surficial windblown sand: These are mapped as separate Quaternary units by Bortugno and Spittler (1968).

Project Geology

The general geology of the Pisgah area has been mapped by Bortugno and Spittler (1986) at a scale of 1:250,000 and by Dibblee and Basset (1966) at a scale of 1:62,500. Within the boundaries of the Project Area, there are five general rock units: Tertiary volcanics, older fanglomerate and gravel, older surficial sediments, Pisgah basalt, and surficial sediments.

Paleontological Resource Inventory

The literature review and the SBCM archival search conducted for this inventory documented only two previously recorded fossil sites within the Project Site. These are along the southern border. However, there are no specimens listed from these two localities. In addition, three localities in the Cady Mountains west of the Project Site have produced vertebrate fossils. Their antiquity, however, has not been ascertained. No Pleistocene vertebrate localities near the Project Site were mentioned by Jefferson (1991a, b). To the south of the Project Site, superimposed layers of silicified plant roots were observed. These are interpreted as Pleistocene paleosols, although the age cannot be demonstrated. In addition, there were apparent burrow structures, presumably from some type of arthropod. The fossil localities reported by the SBCM and the locality discovered by URS are plotted in Figure 5.8-7.

Tertiary volcanics. Volcanic rocks usually have a low sensitivity for paleontological resources, and there are no indications that these are exceptions to that rule.

Older fanglomerate and gravel. It is difficult to find an exposure allowing subsurface characterization of this sedimentary unit on the Project Site. The surface appearance is generally

that of desert pavement. However, south of the Project boundary, paleosols with silicified plant roots were detected in sediments mapped by Dibblee and Bassett (1966) as Older fanglomerate and gravel (Figures 5.8-3 and 5.8-4). Some of the fine-grained sediments between the paleosols appear conducive to preservation of vertebrate fossils, but none were located during the survey. The sensitivity of this rock unit for significant paleontological resources is unknown.

Older surficial sediments. The available exposures where the subsurface of sediments mapped as Older surficial alluvium gravel can be observed indicates that it consists of silts, sands, gravels and cobbles frequently cemented by caliche layers (Figure 5.8-5). The sensitivity of this rock unit for significant paleontological resources is unknown.

Pisgah basalt. As mentioned above, volcanic rocks are usually assigned a low sensitivity for paleontological resources. However, lava tubes in volcanic flows sometimes preserve Holocene and late Pleistocene biotic remains. Holocene aeolian sediments have filled the cracks and crevices within the basalt adjacent to the Project Site (Figure 6), thus making it impossible to determine at this time if any vacuities beneath the sediments might hold biotic remains. Lava tubes are known from this basalt flow (Sylvester et al., 2002). The sensitivity of this rock unit for paleontological resources must be rated as unknown.

Surficial sediments. Two of the SBCM localities lie within areas mapped as Surficial alluvium by Dibblee and Bassett (1966). The majority of the Project is covered by alluvium and alluvial fan gravel of this type. The surface expression is generally a desert pavement. URS did not observe paleontological resources in the proximity of the SBCM localities. Given that these are younger surficial sediments and that the Conformable Impact Mitigation Guidelines of the SVP (1995) reserve the high sensitivity rating for sediments older than recent, the sensitivity of this sedimentary unit for significant paleontological resources must be rated as low.

Summary

Identifiable fossil remains salvaged from these sedimentary units during Project construction may potentially be scientifically important and significant. Uncovered remains may represent new taxa or new fossil records for the area, or for the state of California. They could also represent geographic or temporal range extensions. Moreover, discovered fossil remains could make it possible to more accurately determine the age, paleoclimate, and depositional environment of the sediments from which they are salvaged. Finally, fossil remains salvaged during Project construction could provide a more comprehensive documentation of the diversity of animal and plant life that once existed in San Bernardino County.

5.8.2 Environmental Consequences

Potential effects on paleontological resources resulting from construction of the proposed Solar One can be divided into construction-related effects and operation-related effects. The potential environmental effects from construction and operation of the Project on paleontological resources are presented in the following subsections.

Potential Effects from Project Construction

Potential direct impacts on paleontological resources resulting from construction of the Project primarily involve vegetation clearing, grading, excavations for structure foundations, trenching for pipelines or utilities, and building of access roads. Paleontological resources that could be adversely affected by ground disturbance and earth moving are not restricted to fossil remains. They include associated specimen data and corresponding geologic and geographic site data, and the fossil-bearing strata. Direct impacts described above could disturb previously undisturbed fossiliferous sediments, making those sediments and their paleontological resources unavailable for future scientific investigation. The construction of supporting facilities, such as temporary construction offices, laydown areas, and parking areas could cause adverse impacts to significant paleontological resources if they involve extensive new ground disturbance. In general, Project-related ground disturbance could have adverse impacts on significant paleontological resources. A properly designed and implemented mitigation program, however, would reduce these impacts to a less-than-significant level.

If paleontological finds were to be encountered during construction of the Project, the potential cumulative impacts would be low, as long as mitigation measures were implemented to salvage the resources. Section 5.8.3 provides mitigation measures that would effectively preserve the value to science of any significant fossils uncovered during Project-related excavations.

Potential Effects from Project Operation

No effects on paleontological resources are expected to occur from the continuing operation of the Project or any of its related facilities.

5.8.3 Cumulative Effects

As discussed in detail in Section 5.18, Cumulative Impacts, no effects on paleontological resources are expected to occur from the daily operation of the Project or any of its ancillary facilities after mitigation. Thus, the contribution of the Project to cumulative effects are expected to be negligible.

Construction schedules of the Solar One and Solar Three Projects may overlap. In this instance, the amount of land disturbance is expected to incrementally increase, as the addition of the Solar Three Project will disturb a larger area of land. However, site development and operation, of either project, with mitigation, is not expected to significantly impact paleontological resources. Hence, impacts from both Solar One and Solar Three, when considered cumulatively, are anticipated to be below a level of significance.

Because construction and operation of the transmission line would be performed on previously disturbed area, significant cumulative impacts to paleontological resources are not anticipated.

5.8.4 Mitigation Measures

Mitigation measures designed to minimize the impact of construction activities of the Project to paleontological resources are discussed in this section. The unknown sensitivity of some of the formations for paleontological resources necessitates these measures. Implementation of these measures would reduce the Project's impact to significant paleontological resources to a less-than-significant level. These measures conform to the standard guidelines developed by the SVP for the purpose of mitigating the impact of such construction activity to significant paleontological resources (SVP 1995, 1996).

5.8.4.1 *Monitoring and Mitigation Program*

Prior to construction, the proponent shall retain a qualified paleontologist. The paleontologist shall design a monitoring and mitigation program and implement the program during all Project-related ground disturbance. Items that should be included in the paleontological resource monitoring and mitigation program include:

- an agreement with an accredited paleontological collection to curate significant fossils from the Project,
- preconstruction coordination,
- construction monitoring,
- emergency discovery procedures,
- sampling and data recovery, if needed,
- testing of appropriate sediments, if impacted, for vertebrate microfossils,
- radiocarbon dating of the horizon or horizons producing Pleistocene paleontological resources,
- preparation, identification, and analysis of the significance of fossil specimens salvaged, if any,
- museum storage of any specimens and data recovered, and
- reporting.

Monitoring for paleontological resources shall be done for activities that disturb previously undisturbed sediment with high or unknown sensitivity for paleontological resources. Monitoring is not required in areas where sediments have been previously disturbed, areas of low paleontological sensitivity, above-ground assembly or fabrication or in areas where exposed sediments will be buried but not otherwise disturbed.

Pre-Construction Meetings

Pre-construction meetings shall be held with key construction personnel to provide instructions on paleontological resource significance, visual identification, and fossil discovery notification procedures. The qualified paleontologist shall consult with the Project geologist and Project

engineer on a periodic basis regarding the scheduling and extent of subsurface excavations, particularly where undisturbed areas may be encountered.

Construction Personnel Education

Before the start of construction, personnel involved with earth-moving activities shall be informed of fossils that may be encountered during excavation; of the legal protections for these fossils; of the form of common fossils; and of proper notification procedures. This worker training shall be prepared and presented by a qualified paleontologist.

Implementation of these mitigation measures will reduce the potentially significant adverse environmental impact of Project-related ground disturbance and earth-moving on paleontological resources to an insignificant level by allowing for the salvage of fossil remains and associated specimen data. Corresponding geologic and geographic site data that otherwise might be lost to earth-moving and to unauthorized fossil collecting will be retained.

Possible beneficial impacts on paleontological resources as a result of executing the paleontological resource monitoring and mitigation plan may include the discovery of fossil remains that would not have been exposed without Project construction, and therefore would not have been available for study. These fossils may help answer important questions regarding the geographic distribution, stratigraphic position, and age of fossiliferous sediments in the Project Site.

5.8.5 Compliance with LORS

Paleontological resources are included among nonrenewable scientific resources by governmental agencies. Protections of such resources are provided by federal and state legislation and by some local ordinances. As mentioned in Section 5.8.3, the SVP has developed guidelines and professional standards for assessing the impact of projects on paleontological resources and for mitigation of adverse impacts (SVP 1995, 1996). The Applicant intends for construction and operation of the Project to take place in a manner consistent with all laws, ordinances, regulations, and standards (LORS) relevant to paleontological resources. Table 5.8-1 summarizes these LORS.

**Table 5.8-1
Summary of LORS – Paleontological Resources**

LORS	Requirements	Conformance Section	Administering Agency	Agency Contact
Federal Jurisdiction				
Antiquities Act of 1906	Protects paleontological resources on federal lands	Section 5.8.5.1	BLM	Carrie L. Simmons Archaeologist El Centro Field Office BLM 1661 South 4 th Street El Centro, CA 92243 Phone: 760-337-4437 Fax: 760-337-4490 carrie_simmons@ca.blm.gov
NEPA, 1969	Protects paleontological resources on federal lands	Section 5.8.5.1	EPA	N/A
State Jurisdiction				
CEQA	Protects paleontological resources on state lands	Section 5.8.5.2	CEC	N/A
Public Resources Code Sections 5097.5/5097.9	Protects paleontological resources on state lands	Section 5.8.5.2	CEC	N/A
Local Jurisdiction				
San Bernardino County General Plan	Promotes conservation of paleontological resources within the county	Section 5.8.5.3	San Bernardino County	N/A

Source: PaleoResource Consultants, 2008.

Notes:

BLM = Bureau of Land Management
 CEC = California Energy Commission
 CEQA = California Environmental Quality Act
 EPA = Environmental Protection Agency
 N/A = not available
 NEPA = National Environmental Policy Act of 1969

5.8.5.1 Federal

Federal legislative protection for paleontological resources stems from the Antiquities Act of 1906 (Public Law [P.L.] 59-209; 16 United States Code 431 *et seq.*; 34 Stat. 225), which calls for protection of historic landmarks, historic and prehistoric structures, and other objects of historic or scientific interest on federal land. The Antiquities Act of 1906 forbids disturbance of any object of antiquity on federal land without a permit issued by the responsible managing agency. This act also establishes criminal sanctions for unauthorized appropriation or destruction of

antiquities. The Federal Highways Act of 1958 clarified that the Antiquities Act applied to paleontological resources and authorized the use of funds appropriated under the Federal Aid Highways Act of 1956 to be used for paleontological salvage in compliance with the Antiquities Act and any applicable state laws.

In addition to the Antiquities Act, other federal statutes protect fossils. The Historic Sites Act of 1935 (P.L. 74-292; 49 Stat. 666, 16 U.S.C. 461 *et seq.*) declares it national policy to preserve objects of historical significance for public use and gives the Secretary of the Interior broad powers to execute this policy, including criminal sanctions. The National Environmental Policy Act of 1969 (P.L. 91-190, 31 Stat. 852, 42 U.S.C. 4321-4327) requires that important natural aspects of our national heritage be considered in assessing the environmental consequences of any Project. The Federal Land Policy Management Act of 1976 (P.L. 94-579; 90 Stat. 2743, U.S.C. 1701-1782) requires that public lands be managed in a manner that protects the quality of their scientific values. Paleontological resources are also afforded federal protection under 40 CFR 1508.27 as a subset of scientific resources.

Federal protection for significant paleontological resources would apply to this Project if any construction or other related Project effects occur on federally owned or managed lands.

5.8.5.2 State

The CEC environmental review process under the Warren-Alquist Act is considered functionally equivalent to that of CEQA (Public Resources Code 15000 *et seq.*) with respect to paleontological resources. Guidelines for the Implementation of CEQA, as amended 7 September 2004 (Title 14, Chapter 3, California Code of Regulations 15000 *et seq.*) define procedures, types of activities, persons, and public agencies required to comply with CEQA, and include as one of the questions to be answered in the Environmental Checklist (Section 15023, Appendix G, Section XIV, Part a) the following: “*Will the proposed project directly or indirectly destroy a unique paleontological resource or site?*”

Although neither CEQA nor the Guidelines define what is “a unique paleontological resource or site,” CEQA Section 21083.2 defines “unique archaeological resources” as “...any archaeological artifact, object, or site about which it can be clearly demonstrated that, without merely adding to the current body of knowledge, there is a high probability that it meets any of the criteria described below.

- It contains information needed to answer important scientific research questions and that there is a demonstrable public interest in that information,.
- It has a special and particular quality such as being the oldest of its type or the best available example of its type.
- It is directly associated with a scientifically recognized import prehistoric or historic event.

With only slight modification, this definition is equally applicable to recognizing “a unique paleontological resource or site.” Additional guidance is provided in CEQA Guidelines section 15064.5(a)(3)(D), which indicates “generally, a resource shall be considered historically significant if it has yielded, or may be likely to yield, information important in prehistory or history.”

Paleontological resources are considered to be significant if they:

- provide important information on the evolutionary trends among organisms, relating living organisms to extinct organisms,
- provide important information regarding development of biological communities or interaction between botanical and zoological biota,
- demonstrate unusual circumstances in biotic history, or
- are in short supply and in danger of being depleted or destroyed by the elements, vandalism, or commercial exploitation, and are not found in other geographic localities.

CEQA Guidelines Section XVII, part a, of the Environmental Checklist asks a second question equally applicable to paleontological resources: “Does the project have the potential to eliminate important examples of the major periods of California history or pre-history?” Fossils are important examples of the major periods of California prehistory. To be in compliance with CEQA, environmental impact assessments, statements, and reports must answer both these questions in the Environmental Checklist. If the answer to either question is yes or possibly, a mitigation and monitoring plan must be designed and implemented to protect significant paleontological resources.

The CEQA lead agency having jurisdiction over a project is responsible to insure that paleontological resources are protected in compliance with CEQA and other applicable statutes. California Public Resources Code section 21081.6, entitled Mitigation Monitoring Compliance and Reporting, requires that the lead agency demonstrate Project compliance with mitigation measures developed during the environmental impact review process.

Other state requirements for paleontological resources management are in Public Resources Code Chapter 1.7, Section 5097.5 (Stats. 1965, c. 1136), entitled Archaeological, Paleontological, and Historical Sites. This statute defines any unauthorized disturbance or removal of a fossil site or fossil remains on public land as a misdemeanor and specifies that state agencies may undertake surveys, excavations, or other operations as necessary on state lands to preserve or record paleontological resources. This statute would apply to the Solar One if the Project were to be built on city-owned or state-managed lands.

5.8.5.3 Local

California Planning and Zoning Law requires each county and city jurisdiction to adopt a comprehensive, long-term general plan for its development. The general plan is a policy document designed to give long-range guidance to those making decisions affecting the future character of the planning area. It represents the official statement of the community's physical development as well as its environmental goals. The general plan also acts to clarify and articulate the relationship and intentions of local government to the rights and expectations of the general public, property owners, and prospective investors. Through its general plan, the local jurisdiction informs these groups of its goals, policies, and development standards; thereby, communicating what must be done to meet the objectives of the general plan. State planning law requires each jurisdiction to identify environmental resources and to prepare and implement policies which relate to the utilization and management of these resources.

The County of San Bernardino General Plan specifically addresses paleontological resources in its Open Spaces and Conservation Element. Policies in this section seek to preserve the historical, archeological, paleontological, geological, and cultural resources of the county through development review, acquisition, encouragement of easements, coordination with other agencies and groups, and other methods.

County Guidelines

The County of San Bernardino Development Code specifies several actions for development in areas where paleontological resources might occur. These actions include field survey before grading, monitoring during grading, proper preparation, stabilization, identification, and curation of specimens collected, and reporting of findings.

5.8.5.4 Agencies and Agency Contacts

No state or local agencies have specific jurisdiction over paleontological resources within the Project Area. The Project Site is unincorporated San Bernardino County land. Table 5.8-2 lists agency contact information for the County of San Bernardino.

**Table 5.8-2
Involved Agencies and Agency Contacts**

Agency	Contact	Address	Telephone
Department of Planning and Development San Bernardino County	Carrie Hyke Senior Planner	385 N Arrowhead, 1 st floor San Bernardino, CA 92415	(909) 397-4147
Bureau of Land Management	Jim Shearer Archaeologist	Bureau of Land Management Barstow Field Office 2601 Barstow Road	(760) 252-6034

5.8.5.5 Permits Required and Permitting Schedule

Neither state nor county agencies requires a paleontological collecting permit to allow for the salvage of fossil remains discovered as a result of construction-related earth moving on state or private land in a project site. However, much of the Project Site is land managed by the BLM, and that agency requires any entity salvaging significant fossil resources on those lands to have a Scientific Paleontological Collecting Permit from the California State BLM office and a Fieldwork Authorization from the Barstow BLM Field Office.

Table 5.8-3
Permitting Agencies and Agency Contacts

Agency	Permit	Contact	Telephone	Schedule
California State Bureau of Land Management Office	Scientific Paleontological Collecting Permit	Gina Jorgensen	916. 978.4665	Apply two months before start of construction
Barstow Bureau of Land Management District Office	Fieldwork Authorization	Jim Shearer	760.252.6034	Apply six weeks before start of construction

5.8.5.6 Professional Standards

The SVP, a national scientific organization of professional vertebrate paleontologists, has established standard guidelines (SVP 1995, 1996) that outline acceptable professional practices in the conduct of paleontological resource assessments and surveys, monitoring and mitigation, data and fossil salvage, sampling procedures, and specimen preparation, identification, analysis, and curation. Most practicing professional paleontologists in the nation adhere closely to the SVP's assessment, mitigation, and monitoring requirements as specifically spelled out in its standard guidelines. The SVP's standard guidelines were approved by a consensus of professional paleontologists and are the standard against which all paleontological monitoring and mitigation programs are judged. Many federal and California state regulatory agencies have either formally or informally adopted the SVP's "standard guidelines" for the mitigation of construction-related adverse effects on paleontological resources as a measure of professional practice.

Briefly, SVP guidelines recommend that each project have literature and museum archival reviews, a field survey, and, if there is a high potential for disturbing significant fossils during Project construction, a mitigation plan that includes monitoring by a qualified paleontologist to salvage fossils encountered, identification of salvaged fossils, determination of their significance, and placement of curated fossil specimens into a permanent public museum collection (such as the designated California State repository for fossils, the UCMP at Berkeley).

5.8.6 References

- Bortugno, E. J., and T. F. Spittler. 1986. Geologic map of the San Bernardino Quadrangle. California Division of Mines and Geology Regional Geologic Maps Series, Map 3A.
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- Meek, N. 1990. Late Quaternary geochronology and geomorphology of the Manix Basin, San Bernardino County, California,. Unpublished Ph.D. dissertation: Los Angeles, California, University of California, 212 p.
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- Phillips, F. M. 2003. Cosmogenic ³⁶Cl ages of Quaternary basalt flows in the Mojave Desert, California, USA. *Geomorphology* 53:199-208.
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- SVP (Society of Vertebrate Paleontology), 1996. Conditions of receivership for paleontological salvage collections: Society of Vertebrate Paleontology News Bulletin, No. 166, pp. 31-32.
- Sylvester, A. G., K. C. Burmeister, and W. S. Wise. 2002. Faulting and effects of associated shaking at Pishah Crater Volcano caused by the 16 October 1999 Hector Mine Earthquake (Mw 7.1), Central Mojave Desert, California. *Bulletin of the Seismological Society of America* 92:133-1340.

Wise, W. S. 1969. Origin of basaltic magmas in the Mojave Desert area, California.
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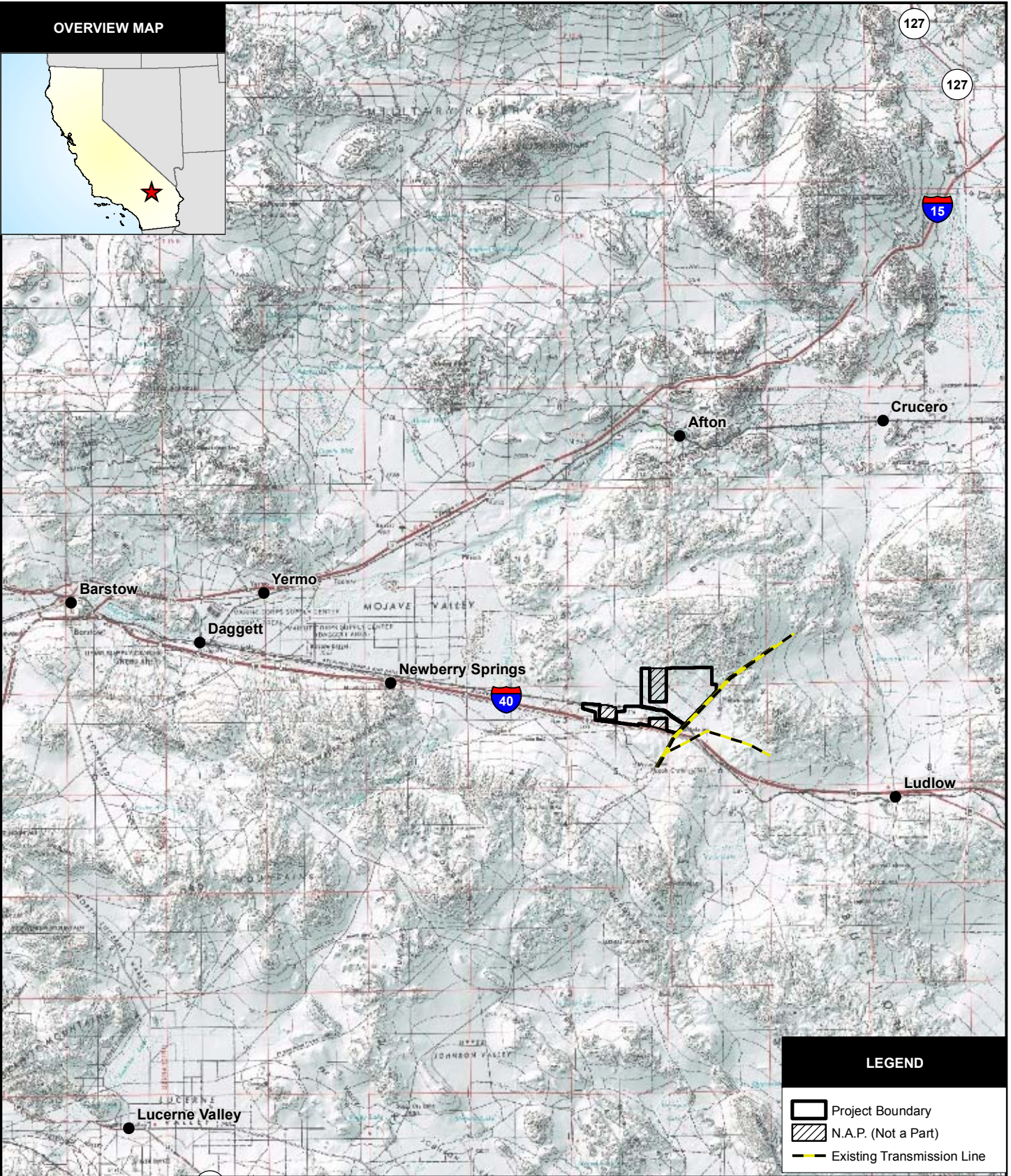
Adequacy Issue:	Adequate		Inadequate		DATA ADEQUACY WORKSHEET		Revision No.	0	Date	
Technical Area:	Paleontological Resources			Project:	SES Solar One		Technical Staff:			
Project Manager:				Docket:			Technical Senior:			
SITING REGULATIONS	INFORMATION			AFC SECTION NUMBER		ADEQUATE YES OR NO	INFORMATION REQUIRED TO MAKE AFC CONFORM WITH REGULATIONS			
Appendix T (g) (1)	...provide a discussion of the existing site conditions, the expected direct, indirect and cumulative impacts due to the construction, operation and maintenance of the project, the measures proposed to mitigate adverse environmental impacts of the project, the effectiveness of the proposed measures, and any monitoring plans proposed to verify the effectiveness of the mitigation.			Section 5.8.1.1 Section 5.8.2 Section 5.8.3 Section 5.8.4						
Appendix T (g) (16) (A)	Identification of the physiographic province and a brief summary of the geologic setting, formations, and stratigraphy of the Project Area. The size of the paleontological study area may vary depending on the depositional history of the region.			Section 5.8.1.1 Section 5.8.1.2 Section 5.8.1.5						
Appendix T (g) (16) (B)	A discussion of the sensitivity of the Project Area described in subsection (g)(16)(A) and the presence and significance of any known paleontologic localities or other paleontologic resources within or adjacent to the project. Include a discussion of sensitivity for each geologic unit identified on the most recent geologic map at a scale of 1:24,000. Provide rationale as to why the sensitivity was assigned.			Section 5.8.1.5						
Appendix T (g) (16) (C)	A summary of all local museums, literature searches and field surveys used to provide information about paleontologic resources in the Project Area described in subsection (g)(16)(A). Identify the dates of the surveys, methods used in completing the surveys, and the names and qualifications of the individuals conducting the surveys.			Section 5.8.1.3						

Adequacy Issue:	Adequate		Inadequate		DATA ADEQUACY WORKSHEET		Revision No.	0	Date	
Technical Area:	Paleontological Resources			Project:	SES Solar One		Technical Staff:			
Project Manager:				Docket:			Technical Senior:			
SITING REGULATIONS	INFORMATION			AFC SECTION NUMBER		ADEQUATE YES OR NO	INFORMATION REQUIRED TO MAKE AFC CONFORM WITH REGULATIONS			
Appendix T (g) (16) (D)	Information on the specific location of known paleontologic resources, survey reports, locality records, and maps at a scale of 1:24,000, showing occurrences of fossil finds, if known, within a one-mile radius of the project and related facilities shall be included in a separate appendix to the Application and submitted to the Commission under a request for confidentiality, pursuant to Title 20, California Code of Regulations, 2501 <i>et seq.</i>			Appendix AA, Paleontological Resources Technical Report (Confidential)						
Appendix T (g) (16) (E)	A discussion of any educational programs proposed to enhance awareness of potential impacts to paleontological resources by employees, measures proposed for mitigation of impacts to known paleontologic resources, and a set of contingency measures for mitigation of potential impacts to currently unknown paleontologic resources.			Section 5.8.4						
Appendix T (i) (1) (A)	Tables which identify laws, regulations, ordinances, standards, adopted local, regional, state, and federal land use plans, leases, and permits applicable to the Project, and a discussion of the applicability of, and conformance with each. The table or matrix shall explicitly reference pages in the application wherein conformance, with each law or standard during both construction and operation of the facility is discussed; and			Section 5.8.5 Table 5.8-1						

Adequacy Issue:	Adequate		Inadequate		DATA ADEQUACY WORKSHEET		Revision No.	0	Date	
Technical Area:	Paleontological Resources			Project:	SES Solar One		Technical Staff:			
Project Manager:				Docket:			Technical Senior:			
SITING REGULATIONS	INFORMATION			AFC SECTION NUMBER		ADEQUATE YES OR NO		INFORMATION REQUIRED TO MAKE AFC CONFORM WITH REGULATIONS		
Appendix T (i) (1) (B)	Tables which identify each agency with jurisdiction to issue applicable permits, leases, and approvals or to enforce identified laws, regulations, standards, and adopted local, regional, state and federal land use plans, and agencies which would have permit approval or enforcement authority, but for the exclusive authority of the commission to certify sites and related facilities.			Section 5.8.5 Table 5.8-1						
Appendix T (i) (2)	The name, title, phone number, address (required), and email address (if known), of an official who was contacted within each agency, and also provide the name of the official who will serve as a contact person for Commission staff.			Section 5.8.5.4						
Appendix T (i) (3)	A schedule indicating when permits outside the authority of the commission will be obtained and the steps the applicant has taken or plans to take to obtain such permits.			Section 5.8.5.5						

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OVERVIEW MAP



LEGEND

- Project Boundary
- N.A.P. (Not a Part)
- Existing Transmission Line



SOURCES: ESRI;
Stantec Engineering (project site Oct. 2008);
USGS (7.5' quads various dates).

REGIONAL VICINITY MAP SOLAR ONE PROJECT



4 0 4 8 Miles

SCALE: 1" = 8 Miles (1:506,880)
SCALE CORRECT WHEN PRINTED AT 8.5x11

CREATED BY: LG

DATE: 11-14-08

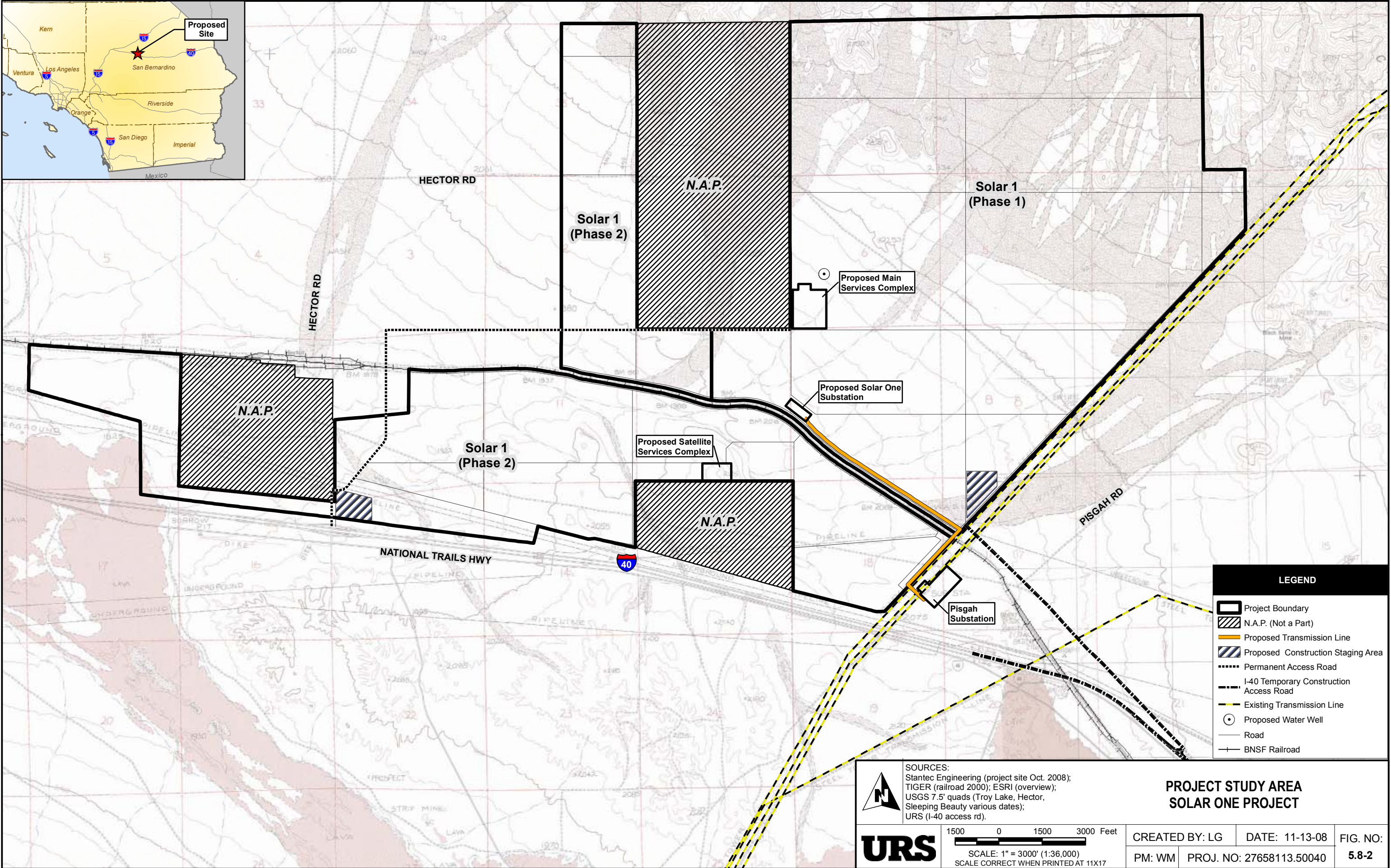
FIG. NO:

PM: WM

PROJ. NO: 27658113.50040

5.8-1

Path: G:\gis\projects\1371276581\00\mxdl\PaleoSolar1_AFCpaleo_study_area.mxd, 11/14/08, lisa_garvey





THREE PALESOLS IN SEDIMENTS MAPPED
AS OLDER FANGLOMERATE AND GRAVEL

URS

PROJ. NO: 27658113

FIG. NO:
5.8-3

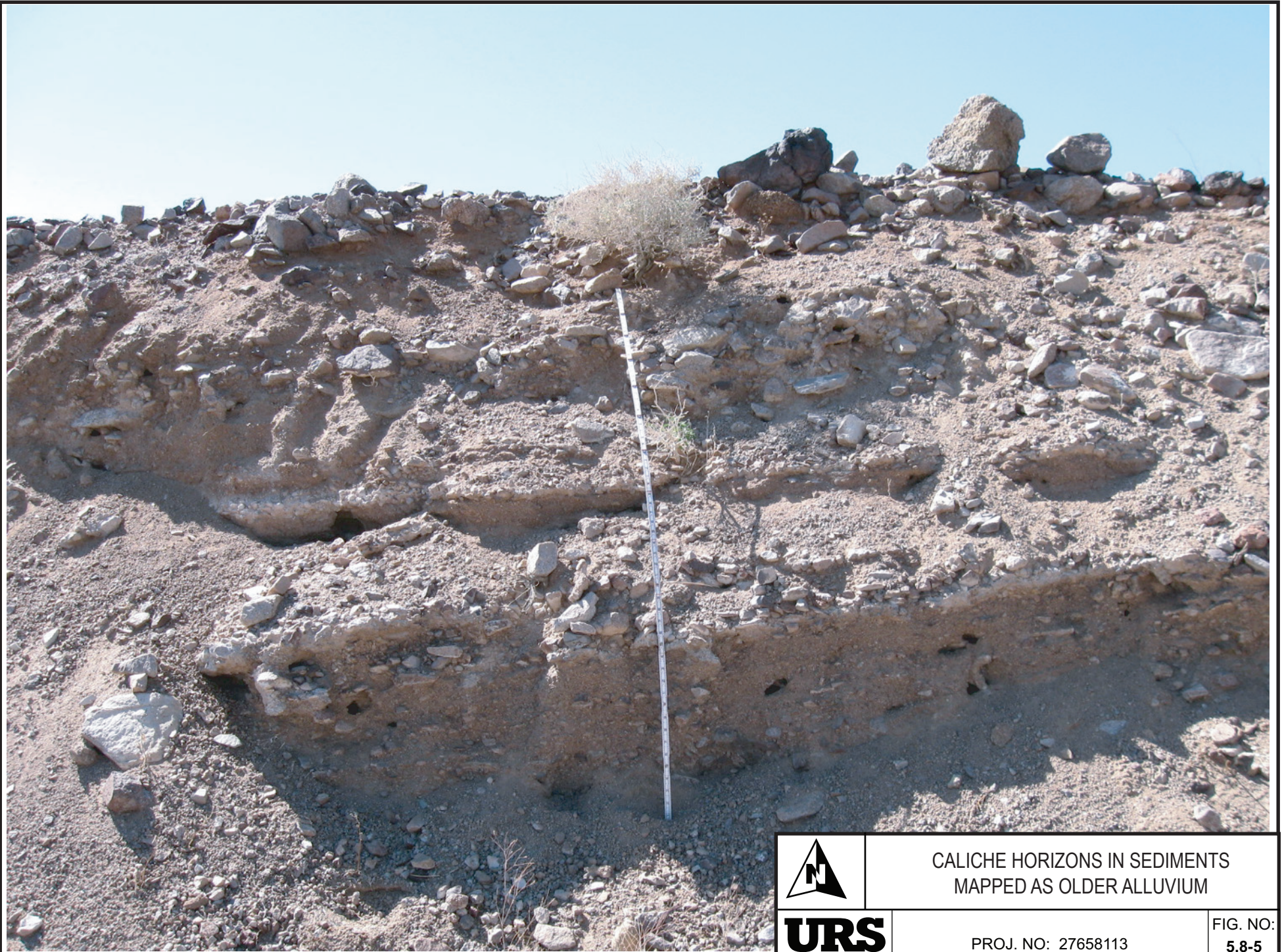


BEDDING PLANE REVEALING
SILICIFIED PLANT ROOTS

URS

PROJ. NO: 27658113

FIG. NO:
5.8-4



CALICHE HORIZONS IN SEDIMENTS
MAPPED AS OLDER ALLUVIUM

URS

PROJ. NO: 27658113

FIG. NO:
5.8-5



BASALT FLOW WITH AEOLIAN
SEDIMENTS FILLING FRACTURE

URS

PROJ. NO: 27658113

FIG. NO:
5.8-6